FCAL ELECTRONICS
EQUIPMENT INSTALLATION RUN 20

POWER REQUIREMENTS

SIGNAL DISTRIBUTION & CABLING

SPACE & COOLING

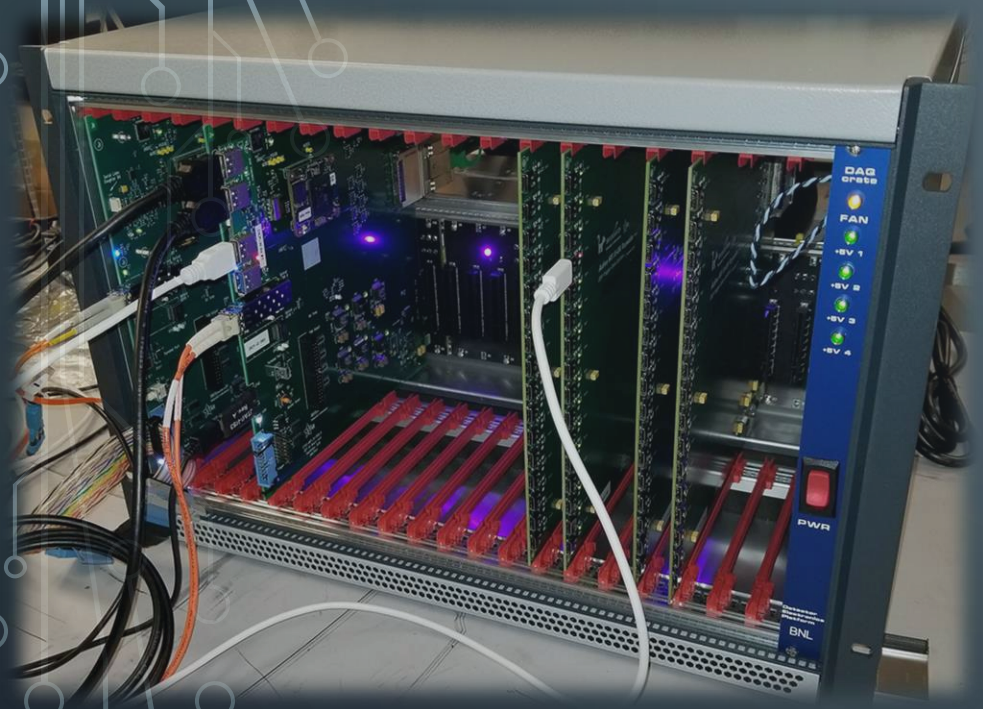
LED MAINTENANCE SYSTEM

Tim Camarda for STAR Electronics Group

BROOKHAVEN NATIONAL LABORATORY

STAR

DEP CRATE INSTALLATION



Five DEP card cages (crates) for Forward Calorimeter System -> (ECAL & HCAL)

Semi- Custom Schroff Ratio Pac Pro.
Box assembled by Nvent Schroff.

Design of Backplane, Power Distribution & Wiring by the STAR Electronics Group

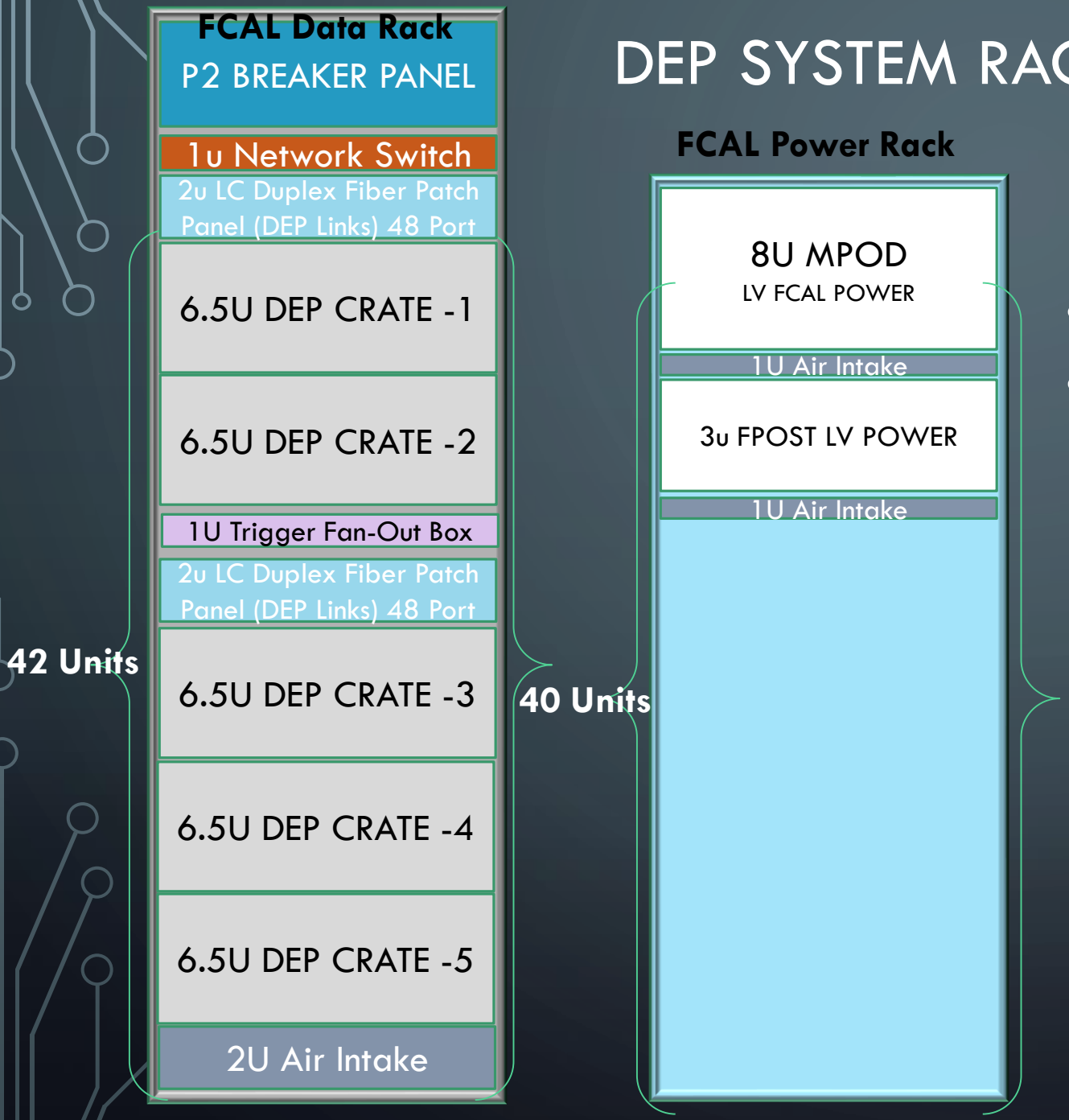
Front Panels: On Order

208 VAC @ 3A

Total power for 20 boards (DEP 32): 600 Watts.

Total Power for DEP System: ~2.6kW

DEP SYSTEM RACK CONFIGURATION



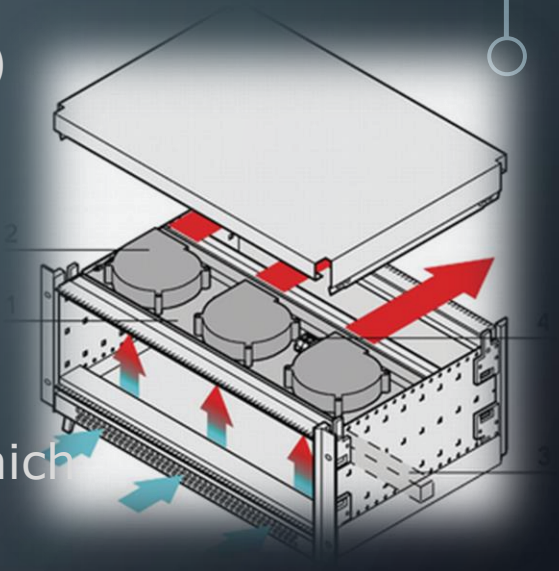
- 60 Amp Breaker 208VAC Service
- Network PDU Mounts inside of rack (Vertical Mount)

DEP CRATE & 19” RACK POWER & COOLING

DEP Crate Power: 208 VAC 600Watts (~3Amps)

- Is Power Available @ Rack → Yes, from P2 Panel and Race-way fed from 60A Breaker

Remote Power Management (2Φ 208VAC Network Power Distribution)



EQUIPMENT COOLING

- Crate designed to cool a compliment of CPCI cards 800 Watts
- DEP(32) system will use ~600 Watts (~2.6kW Total System)
- Crate fans use negative pressure to draw air from the front of the crate, which exhaust hot air through the back.
- Cabling must be dressed to leave space for air to exhaust

The *warm* air that will build up in the back of the rack must be removed and replaced by fresh air. The racks will have a 3U fan assembly that will pull air through the cabinet and bring fresh cooler air in. Therefore racks must have rear doors installed!

Confined Space → May need water cooling?

LV, HV & Detector Signals are Distributed by an All in One Card → PSCB "*Power Signal Communications Board*"

For ECAl we have:

- 16x SPB's Total: 8x South & 8x North
- Attached to pre-existing mounts on detector enclosure
- Mounted on opposite side of beam pipe
- Provides LV & HV to 33x FEE boards
- Communications Link to 33x FEE boards
- 96 Differential Data lines to DEP32

Cable Mapping:

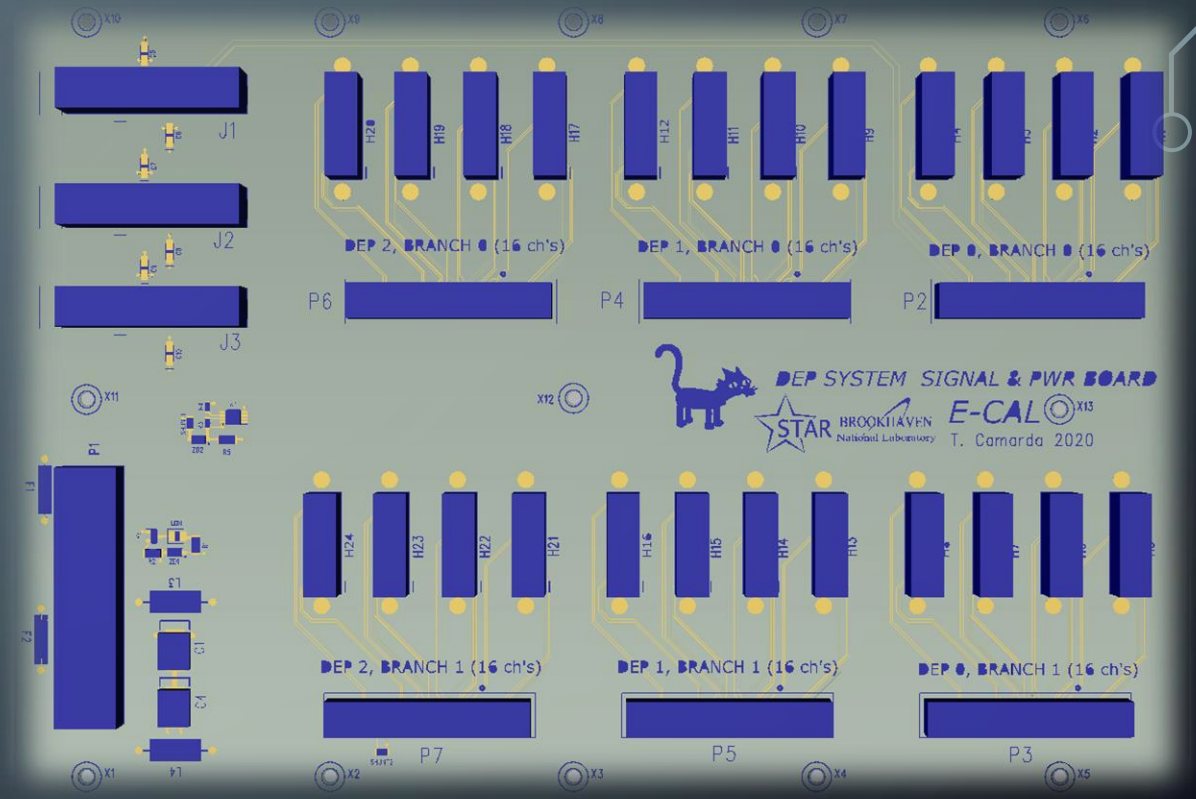
- 28 AWG, slim cables: Provide 4x differential signals
- Each DEP Branch & Channel are Color Code
- Signal Cable Length → 1.5 Meters
- Cables have minimum but adequate slack

Power:

- +/- 6VDC (~3.3A) Power Input Protected by Fuse
- Power Available Indicators
- Power Input filter conditioning
- SiPM Bias Voltage Remote Enable
- Over 50V we may need to consider enable pin @ J1, J2 & J3

Communications:

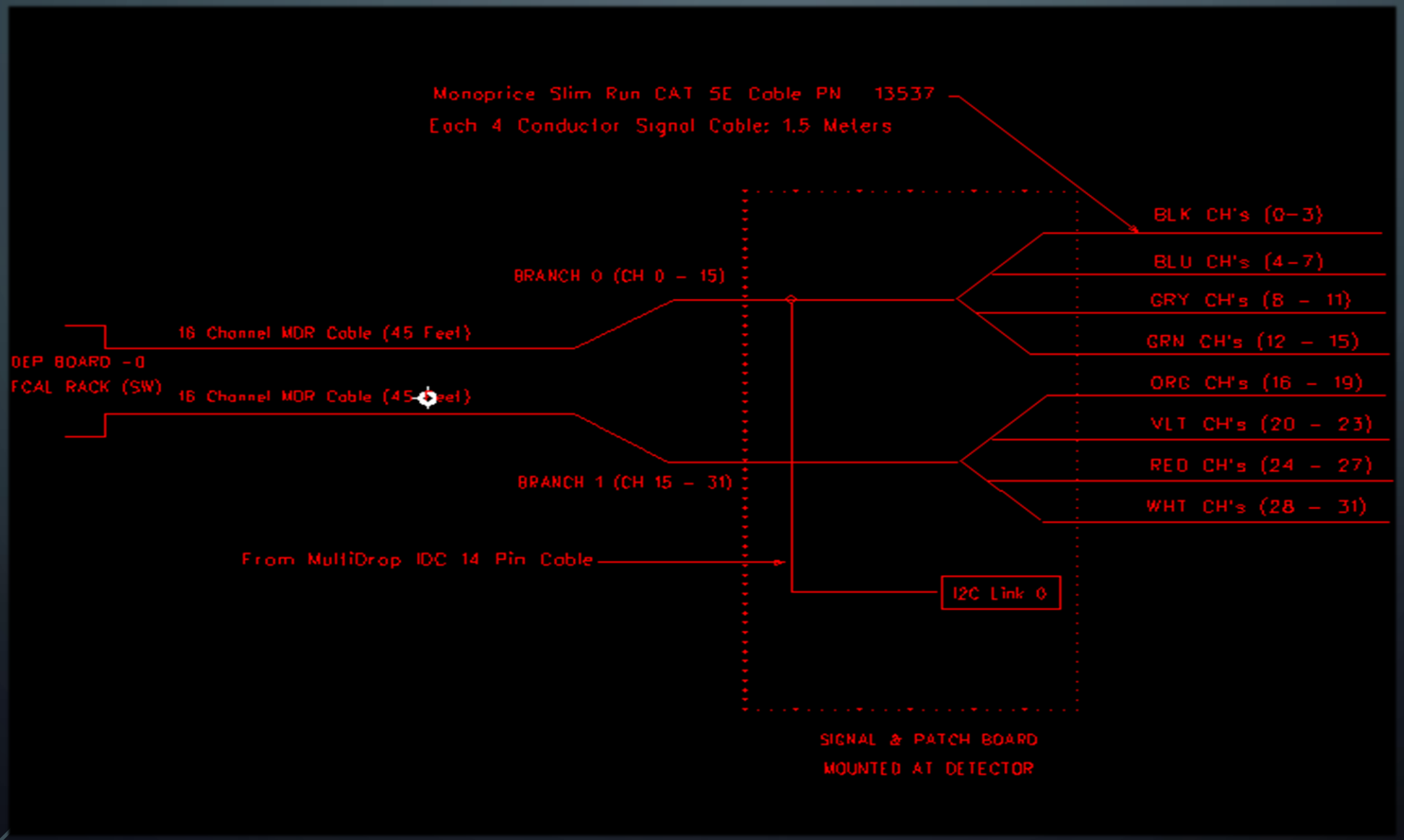
Top DEP Branches (P2, P4, P6) i2C Links



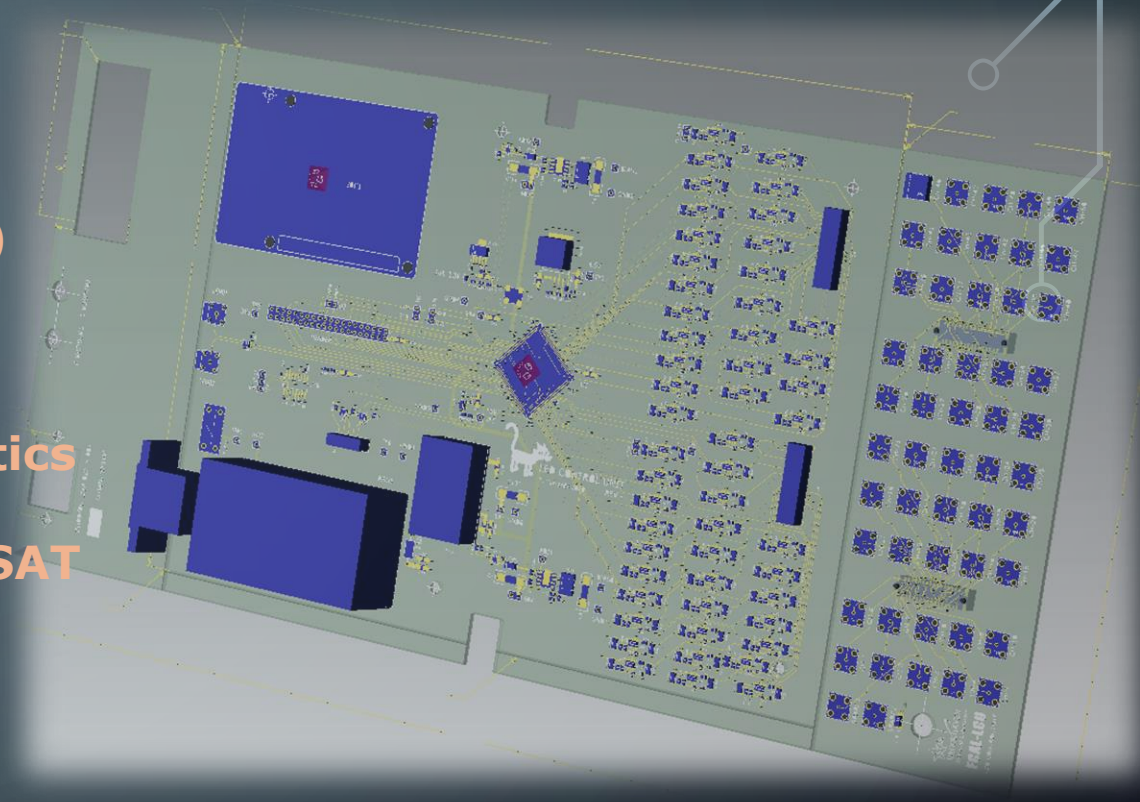
9.5" x 6.5" Board mounted on plate for rigidity

POWER & SIGNAL DISTRIBUTION

SIGNAL DISTRIBUTION SCHEME



LED MAINTENANCE SYSTEM



- 2 Components → Control Board & LED Driver (RX)
- Driver Board Tested W/ 50 Foot Cable: SAT
- LED's chosen from batch with similar characteristics
- Control Board Signal Transmitter Circuit Tested: SAT
- Thermal Stability Compensation +/- 1%
- All LED Driver boards for ECAL System: In House
- Same Design but different board will be used for HCAL
- Control Board and Panels → Out to Fabricator
- Control Board Assembly PO → Sent to Vendor

  -Vendor is waiting to get PCB's